

Chitosan Coated Liposome Incorporated Cyanobacterial Pigment for Nasal Administration in the Brain Stroke

Authors : Kyou Hee Shim, Hwa Sung Shin

Abstract : When a thrombolysis agent is administered to treat ischemic stroke, excessive reactive oxygen species are generated due to a sudden provision of oxygen and occurs secondary damage cell necrosis. Thus, it is necessary to administrate adjuvant as well as thrombolysis agent to protect and reduce damaged tissue. As cerebral blood vessels have specific structure called blood-brain barrier (BBB), it is not easy to transfer substances from blood to tissue. Therefore, development of a drug carrier is required to increase drug delivery efficiency to brain tissue. In this study, cyanobacterial pigment from the blue-green algae known for having neuroprotective effect as well as antioxidant effect was nasally administered for bypassing BBB. In order to deliver cyanobacterial pigment efficiently, the nano-sized liposome was used as a carrier. Liposomes were coated with a positive charge of chitosan since negative residues are present at the nasal mucosa the first gateway of nasal administration. Characteristics of liposome including morphology, size and zeta potential were analyzed by transmission electron microscope (TEM) and zeta analyzer. As a result of cytotoxic test, the liposomes were not harmful. Also, being administered a drug to the ischemic stroke animal model, we could confirm that the pharmacological effect of the pigment delivered by chitosan coated liposome was enhanced compared to that of non-coated liposome. Consequently, chitosan coated liposome could be considered as an optimized drug delivery system for the treatment of acute ischemic stroke.

Keywords : ischemic stroke, cyanobacterial pigment, liposome, chitosan, nasal administration

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